

REMARKS

The Office Action dated March 22, 2004 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 4, 19, 27, 33, 52, 55, and 56 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. Claims 1, 4, 6, 9-12, 16-19, 21, 23-47, 49-52, and 55-60 are respectfully submitted for consideration. Claims 16-18 and 60 have been allowed, and claims 1, 4, 6, 9-12, 19, 21, 23-47, 49-52, and 55-59 are respectfully submitted for consideration.

Claims 1, 4, 6, and 9-12 were objected to because of the phrase "one or more common channels" in claims 1 and 4. Claims 1 and 4 have been amended to remove "one or more." Claims 19, 21, 23-25, 27, and 41-44 were objected to because claims 19 and 27 recited "the control packet." Claims 19 and 27 have been amended to recite "a control packet." The Office Action further objected to the use of "varying" in claims 33 and 52. Those claims have been amended to recite "various" in place of "varying". Claims 55-59 were objected to because claims 55 and 56 are dependent upon claim 54 which was previously cancelled. Claims 55 and 56 have been amended such that they are now dependent upon independent claim 52. Therefore, the above objections are rendered moot.

Claims 26-33, 35-40, 45, 49-52, 56-57, and 59 were rejected under 35 U.S.C. 102(b) as being anticipated by *Flammer* (U.S. Patent No. 5,130,987). The Office Action

alleged that all of the elements recited in these claims are disclosed by *Flammer*. The above rejection is respectfully traversed for the reasons which follow.

Claim 26, upon which claims 27-32 are dependent, recites a method which includes computing a transmission time for a packet from a first node of a computer network according to the identification of the node and an indication of the network age up to the start of a current frame within which the packet is to be transmitted. The computing is performed using a table of entries of pseudorandom values.

Claim 33, upon which claims 34-40 are dependent, recites a method which includes computing a transmission time for a packet from a first node of a computer network according to the identification of the node and an indication of the network age up to the start of a current frame within which the packet is to be transmitted. The method further includes computing, at the first node, transmission times for other nodes that are within a two-hop neighborhood of the first node in the computer network using unique identifiers for each of the other nodes and the network age. Computing transmission times for the other nodes is accomplished using a function that is also used for computing the transmission time for the first node. The first node resolves contentions for transmission times between itself and any of the other nodes according to a priority determination which uses a function that provides a unique output for various identification and network age inputs.

Claim 45 recites a method which includes computing a transmission time for a packet from a first node of a computer network according to the identification of the node

and an indication of the network age up to the start of a current frame within which the packet is to be transmitted. Wherein the packet includes a network control packet which advertises a schedule for a data transmission and the schedule includes a persistence indicator.

Claim 49, upon which claims 50-51 are dependent, recites a method which includes computing a transmission time for a packet from a first node of a computer network according to the identification of the node and an indication of the network age up to the start of a current frame with which the packet is to be transmitted. The method further includes computing, at the first node, transmission times for other nodes that are within a two-hop neighborhood of the first node in the computer network using unique identifiers for each of the other nodes and the network age. Computing transmission times for the other nodes is accomplished using a function that is also used for computing the transmission time for the first node, wherein the first node resolves contention for transmission times between itself and any of the other nodes according to a priority determination and the priority determination is made using a table of pseudorandom values.

Claim 52, upon which claims 55-59 are dependent, recites a method which includes using a topology-independent scheduling procedure utilizing an age of the network and unique identifiers for each node of the network to determine the candidate packet transmission times within a computer network for each of the nodes therein and a topology-dependent scheduling procedure to avoid collisions in contended time periods.

The topology-independent scheduling procedure computes the candidate transmission times for each of the nodes using a function that provides various distribution of outputs for various sampling of inputs.

The claimed invention is directed, in part, to a communication protocol that provides link-level and media access control (MAC) level functions for wireless (e.g. ad-hoc) networks. In ad-hoc networks, hosts and networks (e.g. LANs) may be attached to packet radios, which provide inter-node communication within the ad-hoc network. The protocol is robust to mobility or other dynamics, and for scaling to dense networks. In a mobile or otherwise dynamic network, it appears that any control-packet collisions will be only temporary and fair. In a dense network, the network performance degrades gracefully, ensuring that only a certain percentage of the common channel is consumed with control packets. The denser the network, the longer the access times for nodes to make data scheduling changes. However, the overall network capacity remains constant. Moreover, because the integrated protocol allows packets to be scheduled in a collision-free and predictable manner, multicast packets can be reliably scheduled, as well as streams of delay or delay-jitter-sensitive traffic. Furthermore, using an optional secret network code, known only to authorized nodes in the network, the scheduling of control packets can appear to observers to be randomized—a useful security feature in some environments.

The cited prior art references fail to disclose or suggest the elements of the claims and therefore fails to provide the advantages discussed above.

Flammer discloses a method for synchronizing a wide area network without global synchronizing. A frequency-hopping packet communication system without a master clock or master control unit is based on use of a receiver's frequency hopping timing and identification to control communication. A transmitter acquires synchronization with a target node by use of information previously received from a target. Each receiving node establishes in each station or node a table of receiver frequency hopping sequence offsets of each other node within its communication range, and each node announces by transmission of a packet its presence on each frequency in a packet which includes a hop timing offset indicator.

Flammer does not disclose or suggest, however, computing transmission time according to the “**network** age up to the start of a current frame within which the packet is to be transmitted,” as recited in independent claims 26, 33, 45, 49, and 52. Instead, *Flammer* discloses that the “age of the heard **node** is stored as an age differential relative to the receiving node” (Column 7, lines 41-43). Therefore, *Flammer* does not disclose or suggest computing transmission time by utilizing an indication of the network age as recited in the present claims.

Flammer also fails to disclose or suggest that the computing is performed using a table of pseudorandom values. Rather, *Flammer* discloses that “each pair of nodes can maintain between themselves a different frequency hopping table based on information exchanged or heard at any time by a node receiver” (Column 3, lines 38-41).

In addition, *Flammer* does not disclose “computing, at the first node, transmission

times for other nodes that are within a two-hop neighborhood,” as recited in claim 33.

Moreover, *Flammer* does not mention computing a transmission time for a packet from a **first** node of a computer network.

Applicants submit that claims 27-32, 35-40, 50-51, 56-57 and 59 depend from independent claims 26, 33, 49, and 52 respectively; and therefore should be found allowable for at least their dependence upon the independent claims and the specific limitations recited therein.

As such, applicants respectfully submit that the rejection of claims 26-33, 35-40, 45, 49-52, 56-57, and 59 as being anticipated by *Flammer* is improper because *Flammer* fails to disclose or suggest all of the elements of the claims.

The Office Action rejected claims 34, 55, and 58 as being rendered obvious under 35 U.S.C. 103(a) over *Flammer* as applied to claims 33, 54, or 57, in further view of *Dent* (U.S. Patent No. 5,896,375). The Office Action asserts that *Flammer* discloses all of the elements of claims 34, 55, and 58, apart from using an encryption algorithm to compute transmission times. The Official Action then relies on *Dent* to cure this deficiency. The above rejection is respectfully traversed for the reasons which follow.

Dent discloses a radio communication system that is capable of carrying data, voice, or data and voice traffic simultaneously. The band is divided into a plurality of channels or hops, and a frame composed of either voice information, data information, or a combination of data and voice information is transmitted during one of the hops. A

multiple time slot operation is employed whereby one time slot can carry data and another time slot can carry voice information.

Again, applicants respectfully submit that an indication of the network age is an element that is not disclosed or even suggested by *Flammer*. In fact, the network age recited in the claimed invention is a special feature that is introduced by an ad hoc network. *Dent* also fails to disclose an indication of the network age and thus fails to cure this deficiency in *Flammer*. Therefore, *Flammer* and *Dent*, whether taken alone or in combination, fail to disclose or suggest the elements of claims 34, 55, and 58.

Furthermore, claims 34, 55 and 58 are dependent upon claims 33 and 52 respectively. Thus, claims 34, 55, and 58 should be found allowable for at least their dependence upon claims 33 and 52, and the specific limitations recited therein.

Claim 45 has also been rejected under 35 U.S.C. 103(a) as being unpatentable over *Flammer* in view of *Grayson* (U.S. Patent Publication No. 2003/0043763 A1). In making this obviousness rejection, the Office Action takes the position that *Flammer* discloses every element of this claim, except for a control packet that includes a persistence indicator. The Official Action then asserts that *Grayson* discloses this specific limitation. The above rejection is respectfully traversed.

Grayson discloses a wireless communication system which includes a number of devices to be clustered for the exchange of data and control message packets. Each node has a unique address within the cluster and is arranged to accept only messages transmitted to it. A dynamic rerouting technique is provided whereby a message packet

not received by its target node is detected and rerouted via other nodes of the cluster, until transmission is successful or a predetermined number of failed attempts have been made.

As discussed above, *Flammer* does not disclose or suggest “an indication of the network age up to the start of a current frame within which the packet is to be transmitted.” *Grayson* also fails to cure this deficiency in *Flammer*. Therefore, *Flammer* and *Grayson*, whether taken alone or in combination, fail to disclose or suggest the elements of claim 45.

Claims 46-47 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Flammer* in view of *Balachandran* (U.S. Patent No. 6,115,394). The Office Action took the position that *Flammer* teaches all of the elements of claims 46 and 47, with the exception of nodes identified by local identifiers which are smaller than network identifiers associated with the nodes. The Office Action relies on *Balachandran* to cure the deficiency in *Flammer* with respect to claims 46 and 47. The above rejection is respectfully traversed for the reasons which follow.

Claim 46 recites a method which includes computing a transmission time for a packet from a first node of a computer network according to the identification of the node and an indication of the network age up to the start of a current frame within which the packet is to be transmitted. The packet includes a network control packet which advertises a schedule for a data transmission and the schedule includes an identification of one or more nodes to receive the data transmission. The nodes to receive the data

transmission are identified by local identifiers being smaller than network identifiers associated with the nodes.

Balachandran discloses a method and system for reducing overhead in the communication of messages having a message header over a communication link. An alias address is selected from a predefined set of alias addresses and associated with a portion of the header of the message. The portion of the message header is removed from the message and the alias address substituted. This reduced data message is transmitted. The message is reconstructed based on the alias address and the associated portion of the original message.

As a result, *Balachandran* is directed to a method of using “alias addresses”, specifically “associating the alias address with a portion of the header of the original message and then reconstructing the original message based on the alias address, the present invention provides for reduced overhead per communication” (*Balachandran*, Column 2, lines 35-39). The solution disclosed in *Balachandran* is quite different from that which is recited in the claimed invention. The claimed invention relies on existing local identifiers, which are not replacements of any other identifier, as the “alias address” clearly is. Thus a person of ordinary skill in the art would not yield the invention recited in claims 46 or 47 by combining *Flammer* and *Balachandran*, but instead would create a new type of “alias address.”

Claim 46 contains the limitation of “computing a transmission time for a packet from a first node of a computer network according to the identification of the node and an

indication of the network age up to the start of a current frame within which the packet is to be transmitted.” As stated above, with respect to the rejection of claims 26-33, 35-40, 45, 49-52, 56-57, and 59, *Flammer* fails to disclose or suggest an indication of the network age as recited in the claims.

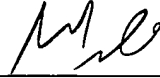
Therefore, applicants respectfully submit that the combination of *Flammer* and *Balachandran* fails to disclose or suggest the elements of claims 46 and 47. Applicants further submit that claim 47 is dependent upon claim 46 and should be allowed for at least that dependence, and for the specific limitations recited therein.

Applicants respectfully submit that the cited prior art reference of *Flammer*, *Dent*, *Grayson*, and *Balachandran* fail to disclose or suggest critical and important elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1, 4, 6, 9-12, 16-19, 21, 23-47, 49-52, and 55-60 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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